

# Restoration Potential within a Ground Water Basin San Gabriel Valley Area 3 Superfund Site



# Goals of Presentation

- Discuss potential remedial action objectives (RAOs) for Area 3
- Discuss practicability of ground water restoration
- Evaluate whether to develop a Final or Interim ROD

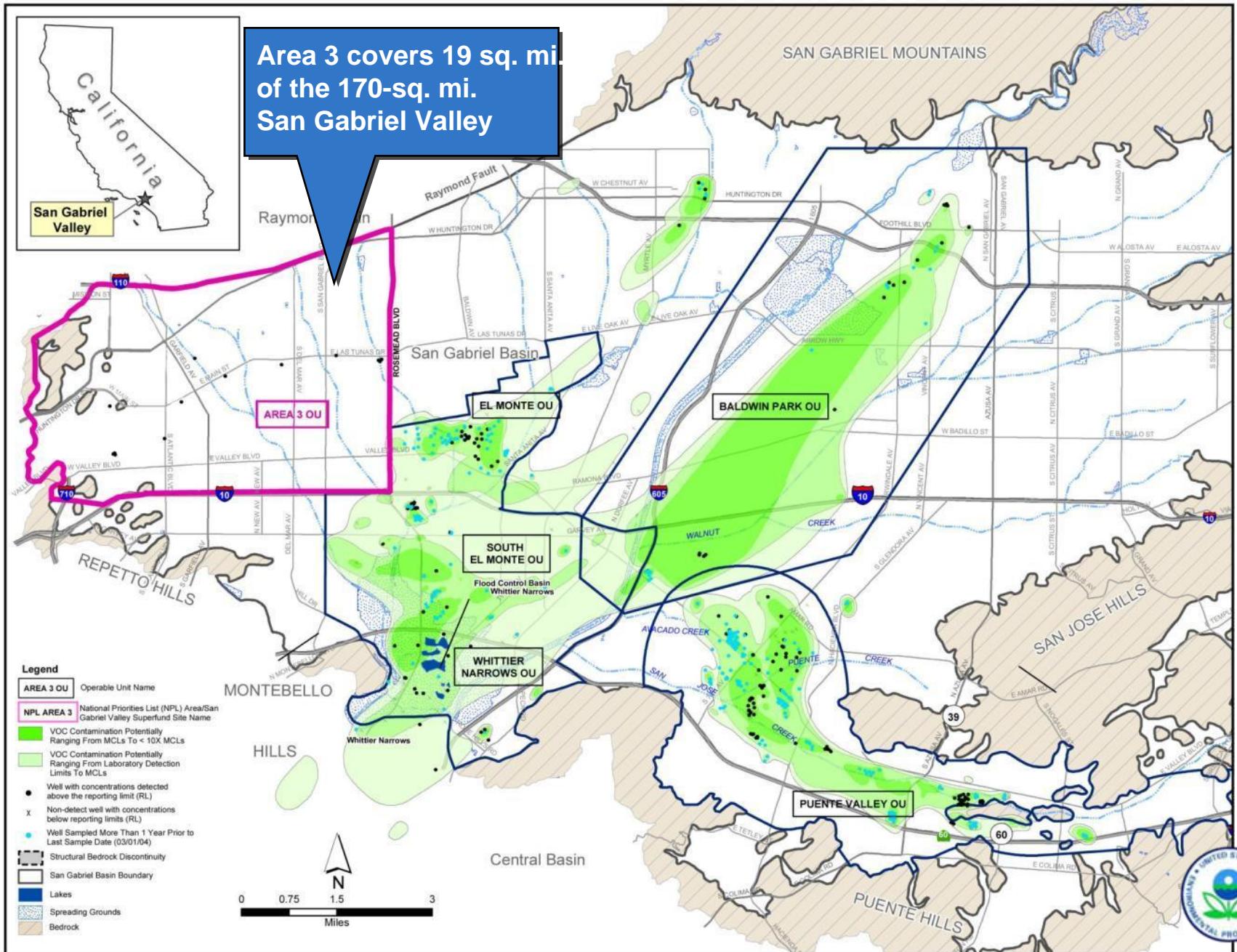


# Area 3 Site Overview

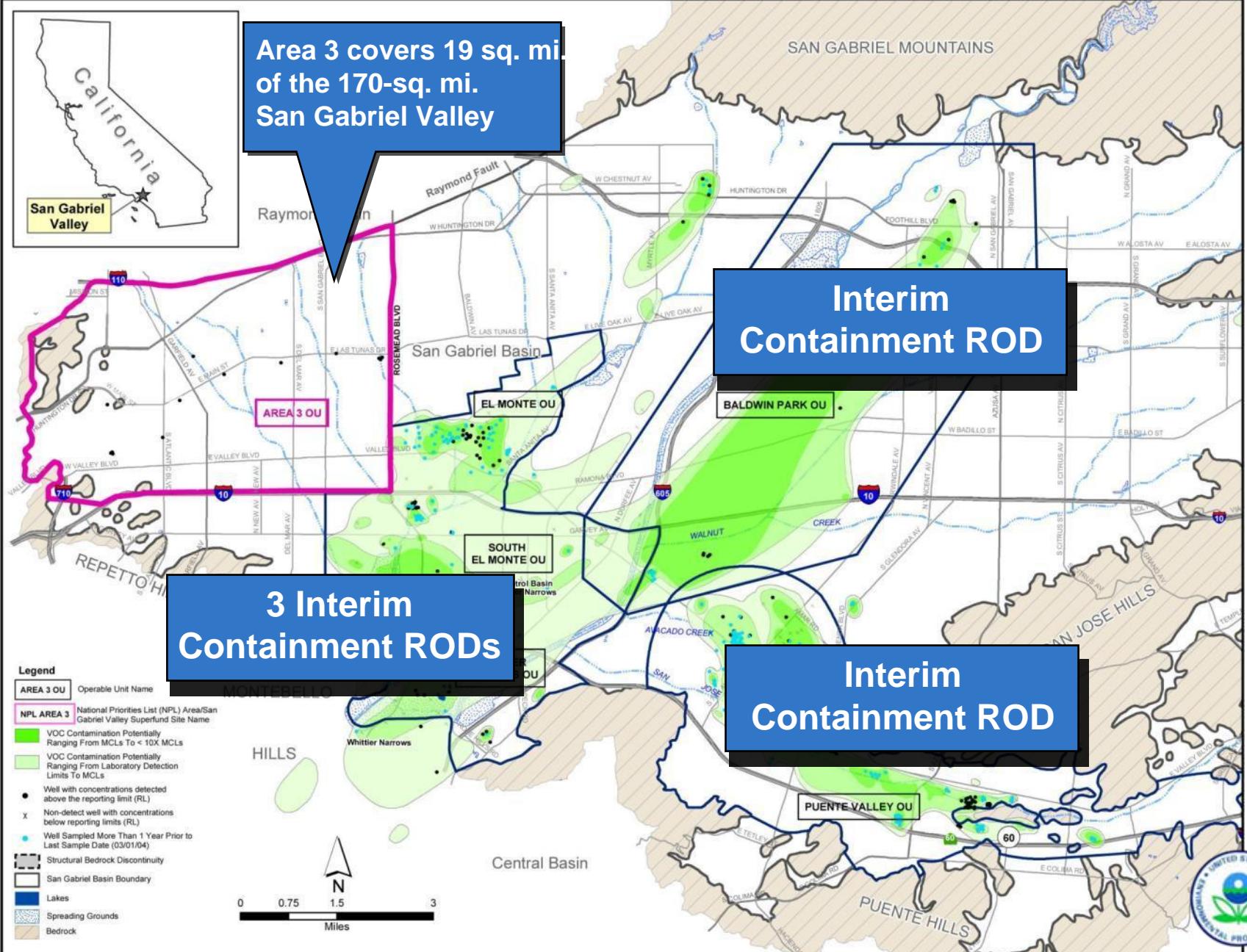
- Site comprises 19-square-miles of ground water within 170-square-mile San Gabriel Groundwater Basin
- EPA Fund lead site
- Intermittent areas of dense population and commercial land use
- Depth to ground water varies from 70 to 180 feet
- Widespread diffuse VOC contamination in ground water
- RI completed in June 2009
- FS report and ROD targeted for 2011



# San Gabriel Valley Superfund Sites



# San Gabriel Valley Superfund Sites



# San Gabriel Valley Superfund Sites



Area 3 covers 19 sq. mi.  
of the 170-sq. mi.  
San Gabriel Valley

Final or Interim ROD?

Interim  
Containment ROD

3 Interim  
Containment RODs

Interim  
Containment ROD

Legend  
AREA 3 OU Operable Unit Name

NPL AREA 3 National Priorities List (NPL) Area/San Gabriel Valley Superfund Site Name

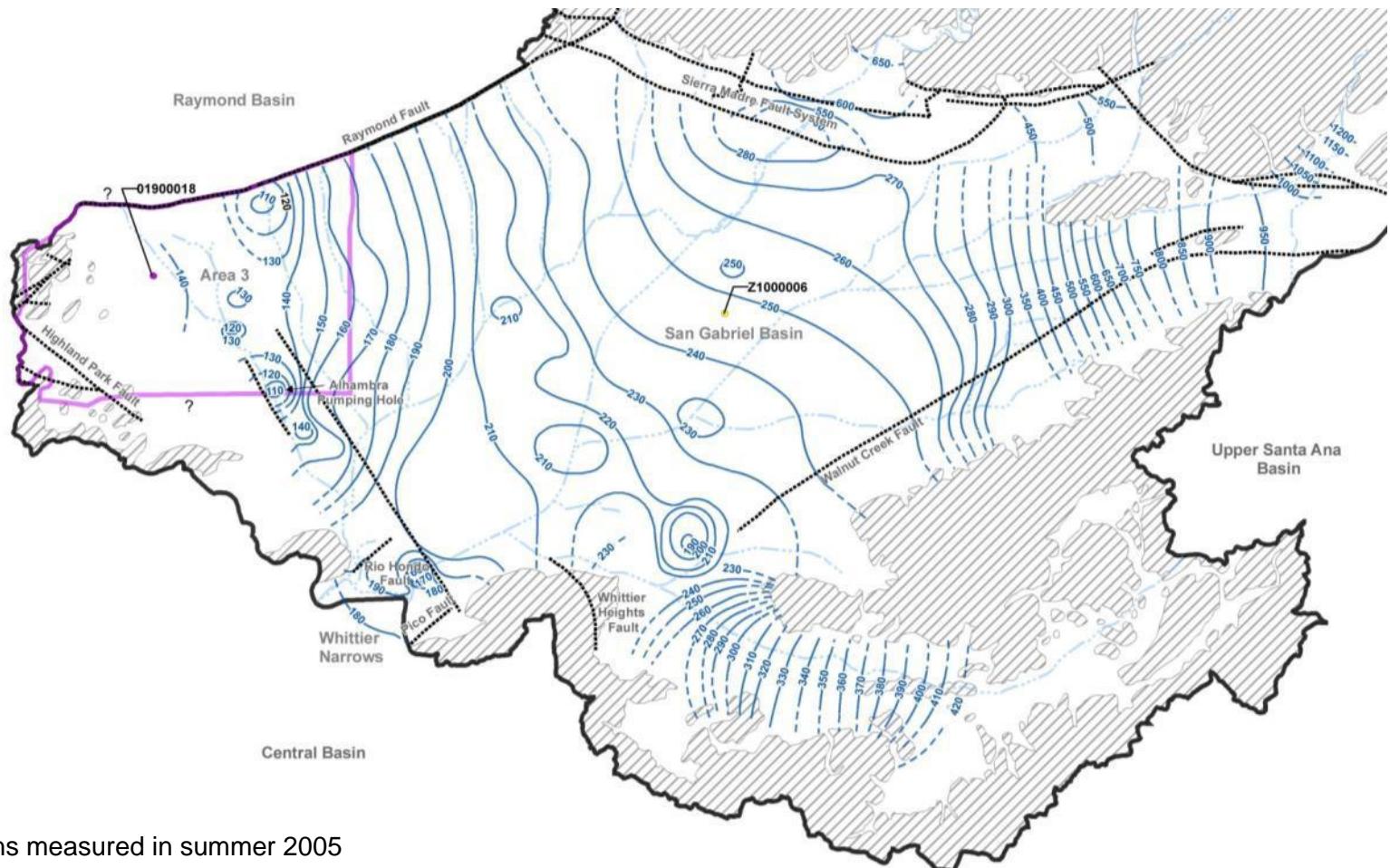
VOC Contamination Potentially Ranging From MCLs To < 10X MCLs  
VOC Contamination Potentially Ranging From Laboratory Detection Limits To MCLs

- Well with concentrations detected above the reporting limit (RL)
- ✗ Non-detected well with concentrations below reporting limits (RL)
- Well Sampled More Than 1 Year Prior to Last Sample Date (03/01/04)
- Structural Bedrock Discontinuity
- Lakes
- Spreading Grounds
- Bedrock

0 0.75 1.5 3  
Miles



# Regional Ground Water Contours – San Gabriel Ground Water Basin



Elevations measured in summer 2005



# Geologic Map of Area 3

## Legend

- Los Angeles City Flood Control District Monitoring Well
- ▲ EPA Monitoring Well
- ▲ Facility Monitoring Well
- Production Well
- ▲ PRP Monitoring Well
- ▲ UST Monitoring Well



## Cross Section Locations

A — A'

E — E'

Faults (short dash indicates that fault impedes groundwater flow)

— Fault Surface Features

— Highway

— Major Street

— Railway

— Streams

— Structural Bedrock Discontinuity

— Area 3 Site

— Spreading Ground

— Alluvium (Quaternary)

— Pico Formation (Pliocene)

— Puente Formation (Upper Miocene)

— Topanga Formation (Middle Miocene)

## Notes:

1. Treiman, J.A., 1991. Whittier Fault Zone, Los Angeles and Orange Counties, California. California Division of Mines and Geology Fault Evaluation Report FER-222.

2. California Division of Mines and Geology Geologic Map of Elysian Park – Repetto Hills Area, Los Angeles Counties California. Mapped 1958-1960. Revised and Extended 1961-1965.

This figure (3-4) is the same as Figure D-7 in Appendix D.



0 1,750 3,500

7,000

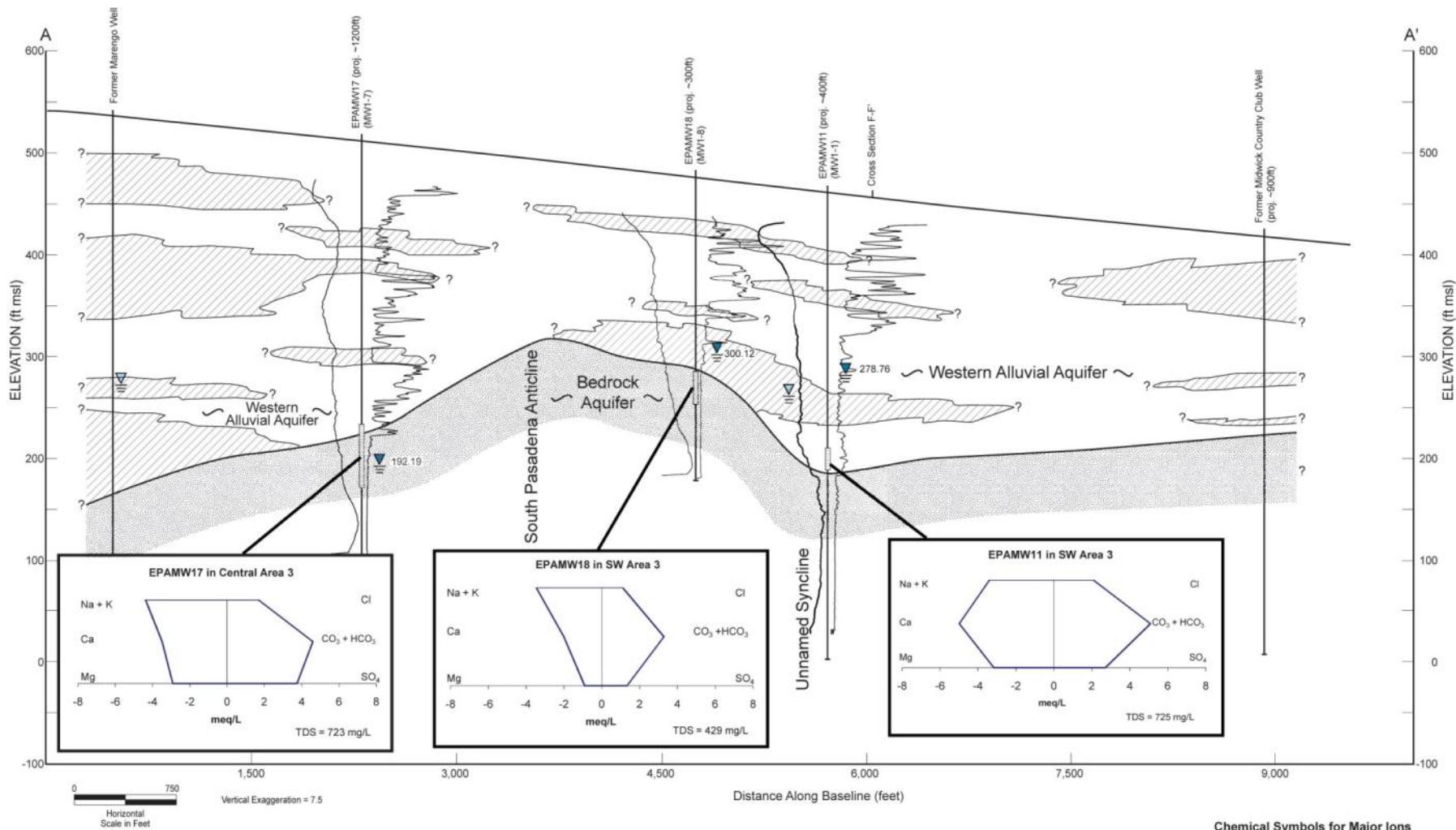
Feet



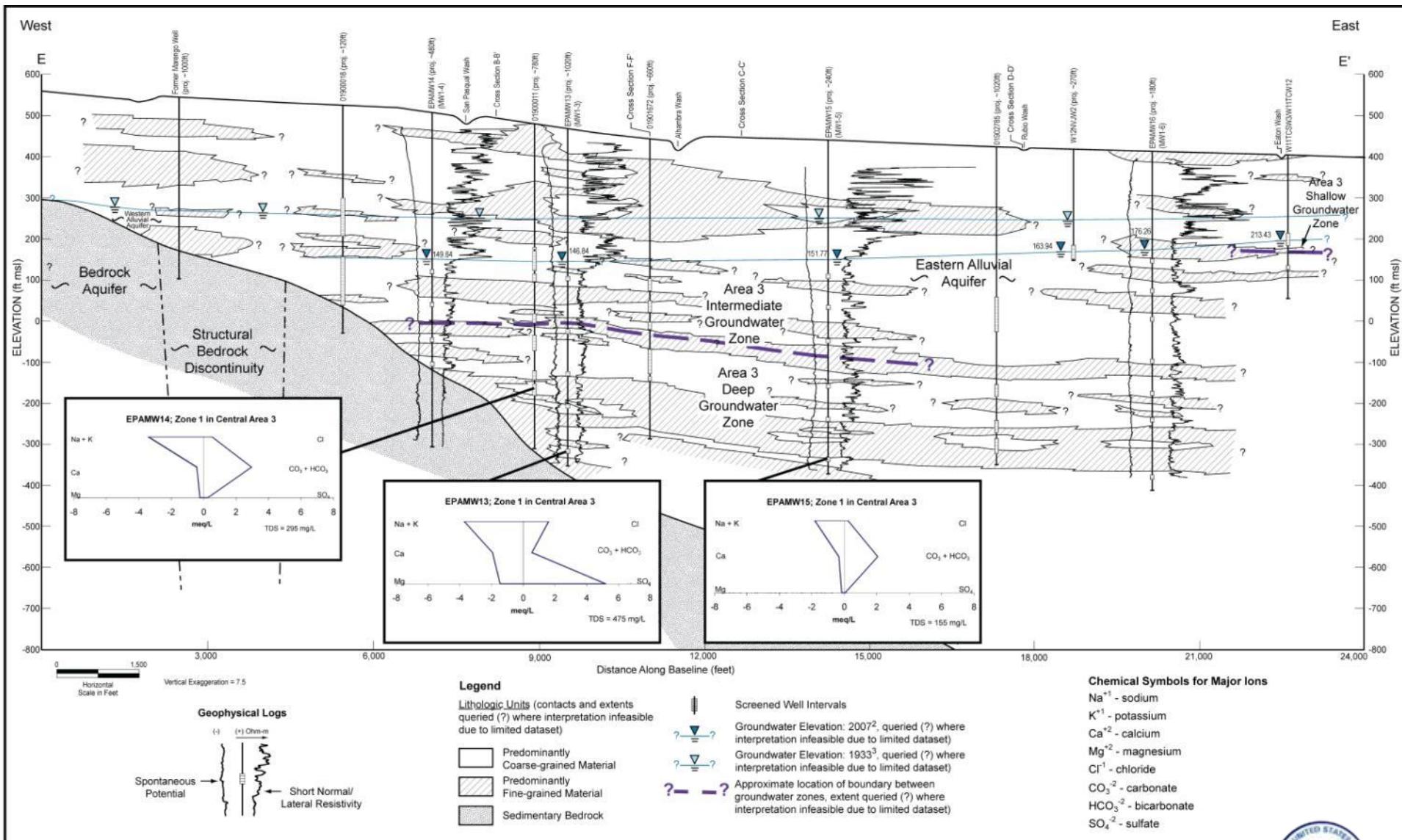
# Cross-Section A-A'

Northwest

Southeast



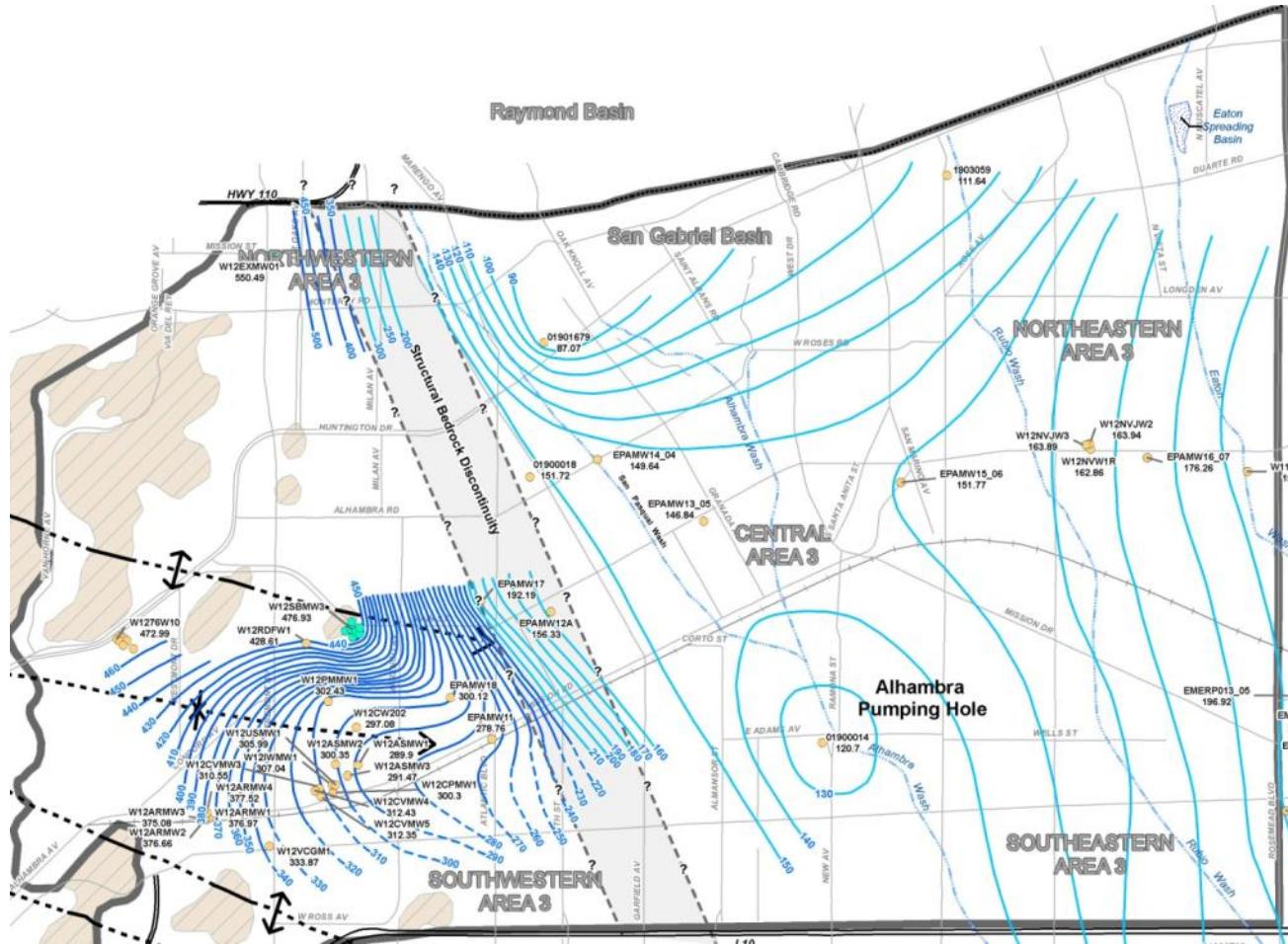
# Cross-Section E-E'



SCO385133.PP05 cross\_section\_EE.ai 11/09



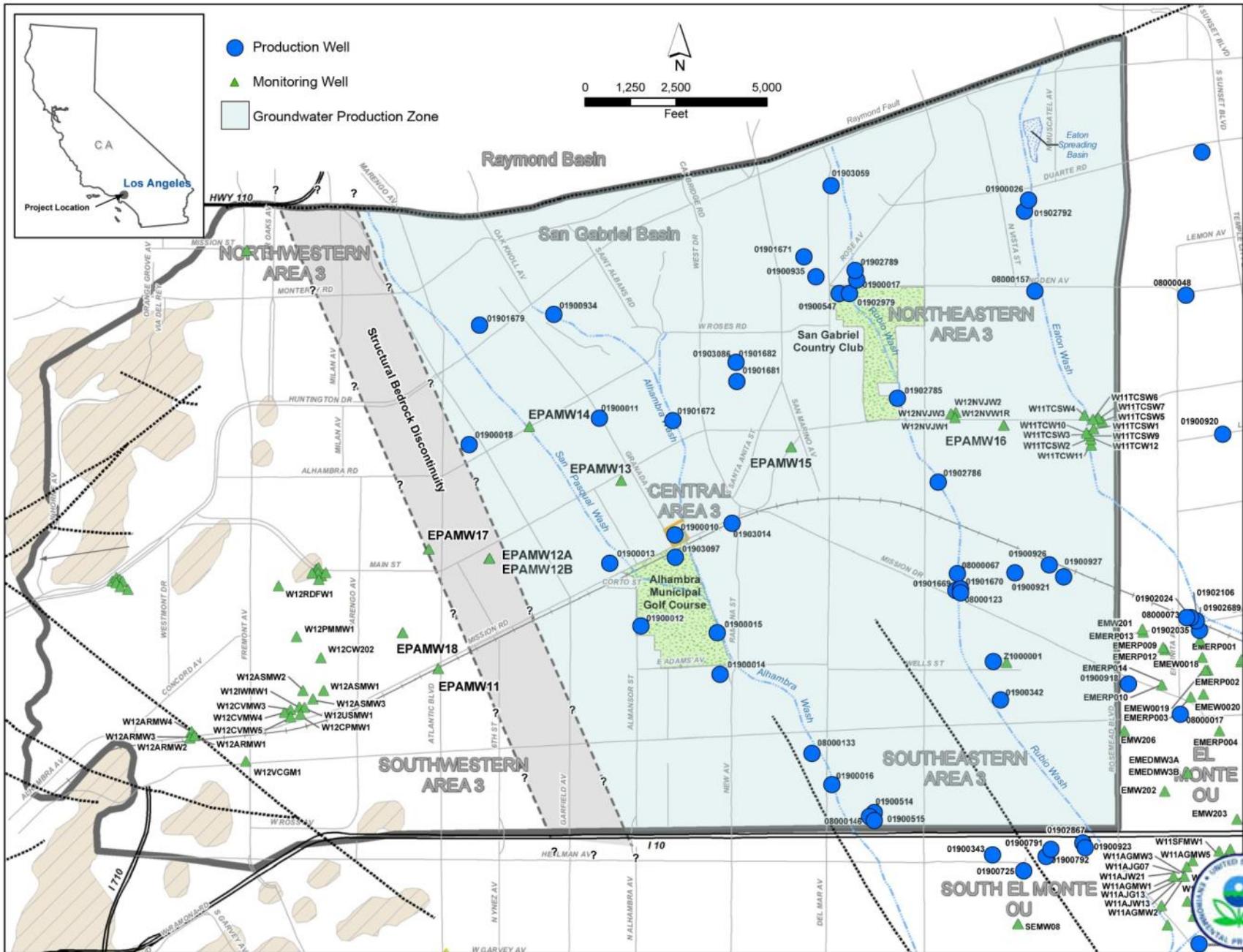
# Ground Water Elevations – Intermediate Ground Water Zone in Area 3



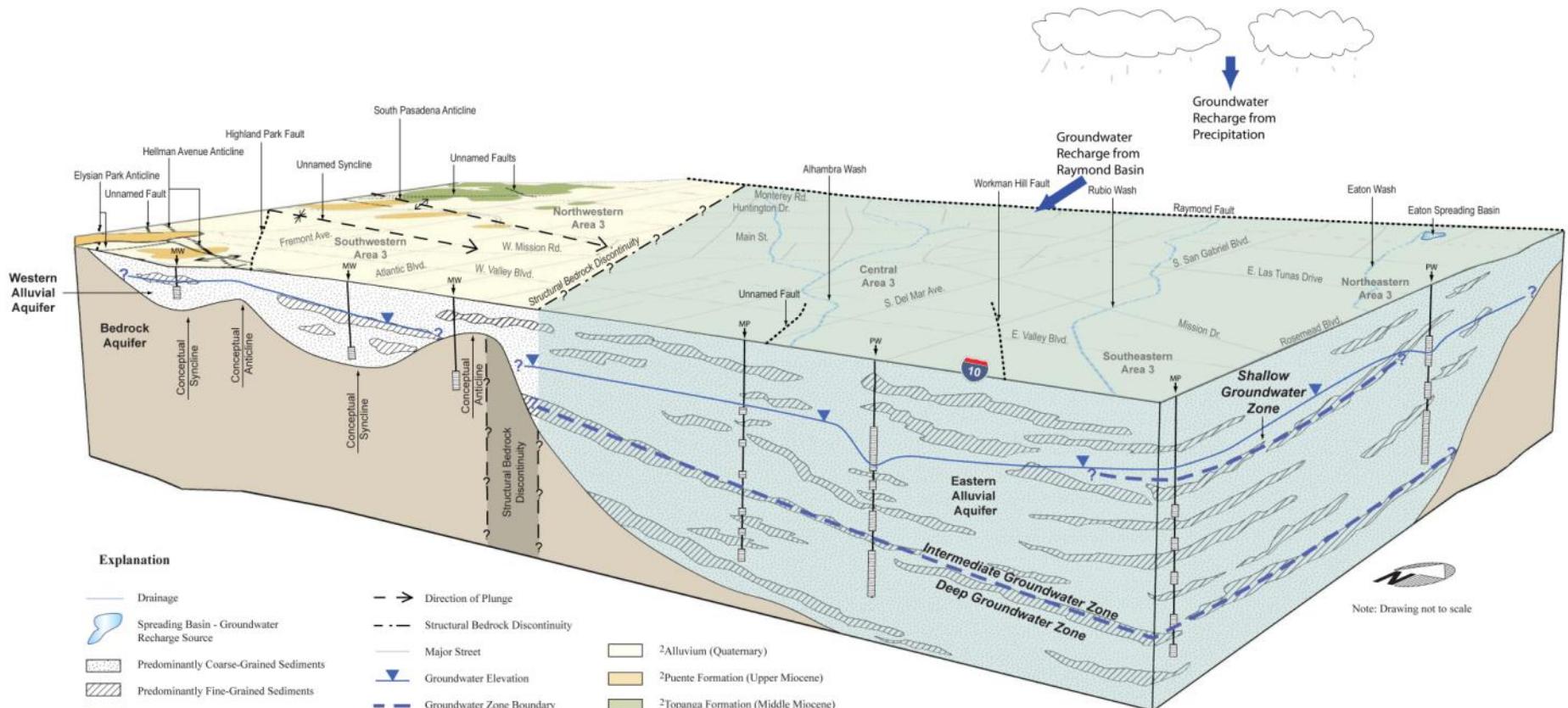
Elevations measured in winter and spring 2007



# Ground Water Production Zone



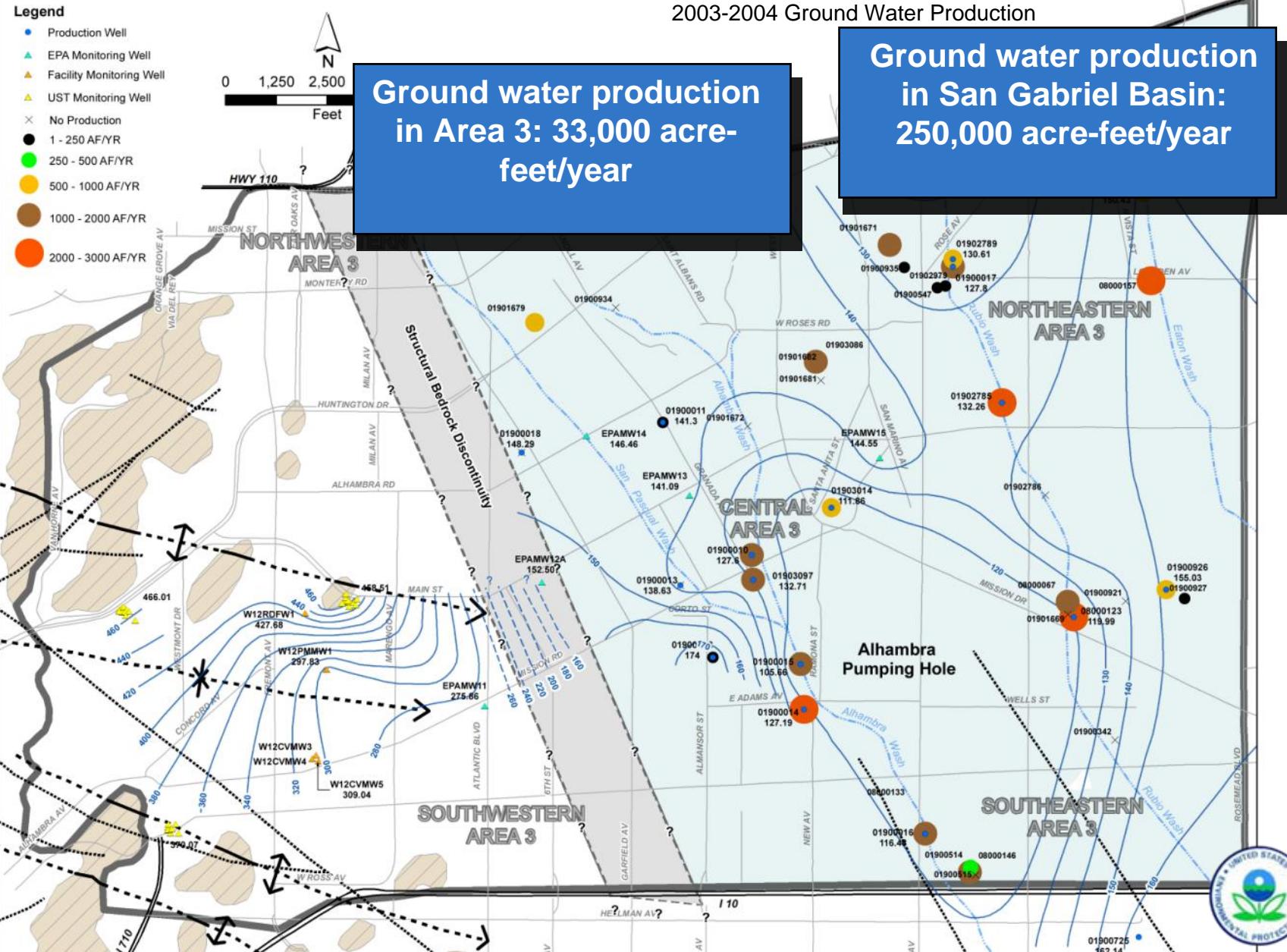
# Area 3 Conceptual Site Model



**Depth to Uppermost  
Ground Water is 70 to 180 feet**



# Ground Water Production and Composite Ground Water Contours for Intermediate/Deep Zones in Area 3



# Scope of Contaminant Source Investigation

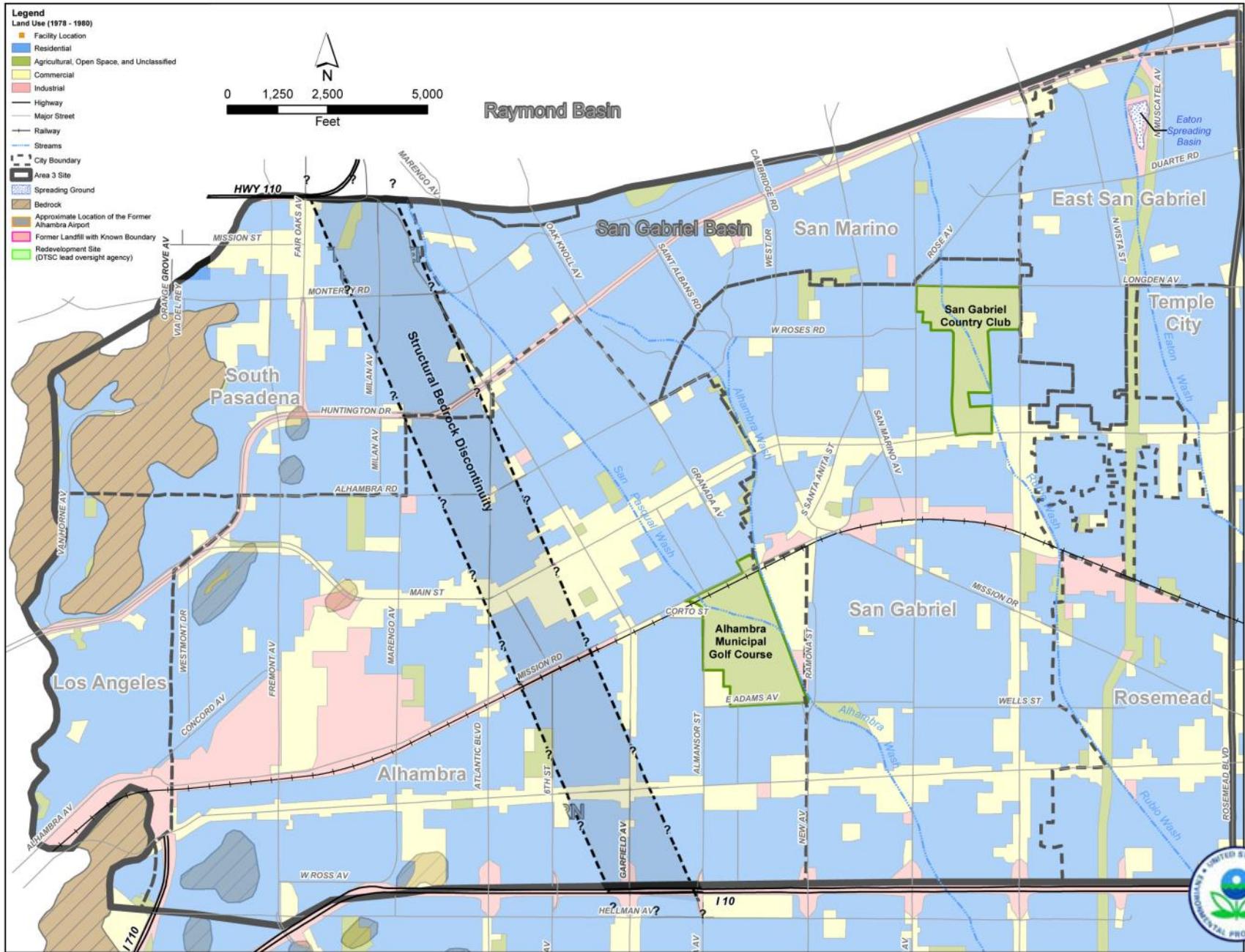
- Sources investigated to the extent practicable over 10 year period
- Cost of RI to date: \$17M
- Locating all sources is impracticable due to:
  - Changes in flow patterns have occurred with large increases in population and ground water use since 1950s
  - Large number of potential sources of contamination

Status of Investigation at Potential Source Facilities	Approximate Number of Potential Source Facilities
Initially screened	500
Eliminated from investigation	200
Slated for elimination from investigation	150
Contamination in soil, soil vapor or ground water investigated	33
Further research and investigation?	100

- Large uncertainty in history of chemical use in potential source areas
  - Industrial activities (and potential releases) date to 1930s or earlier
  - Land use changed from agricultural to residential and commercial/industrial
  - Historical records sketchy, missing or produced few leads

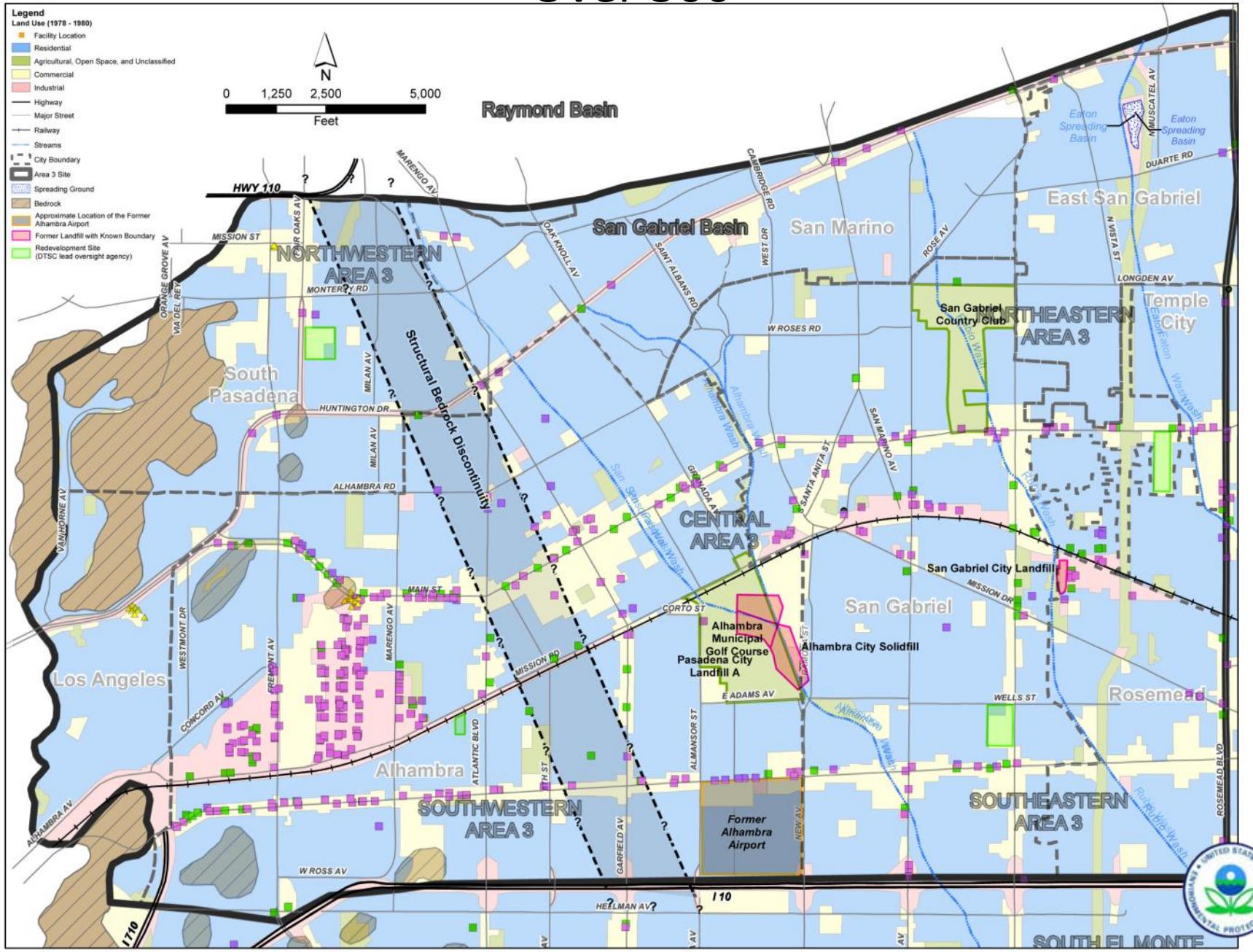


# Land Use in Area 3 – Residential

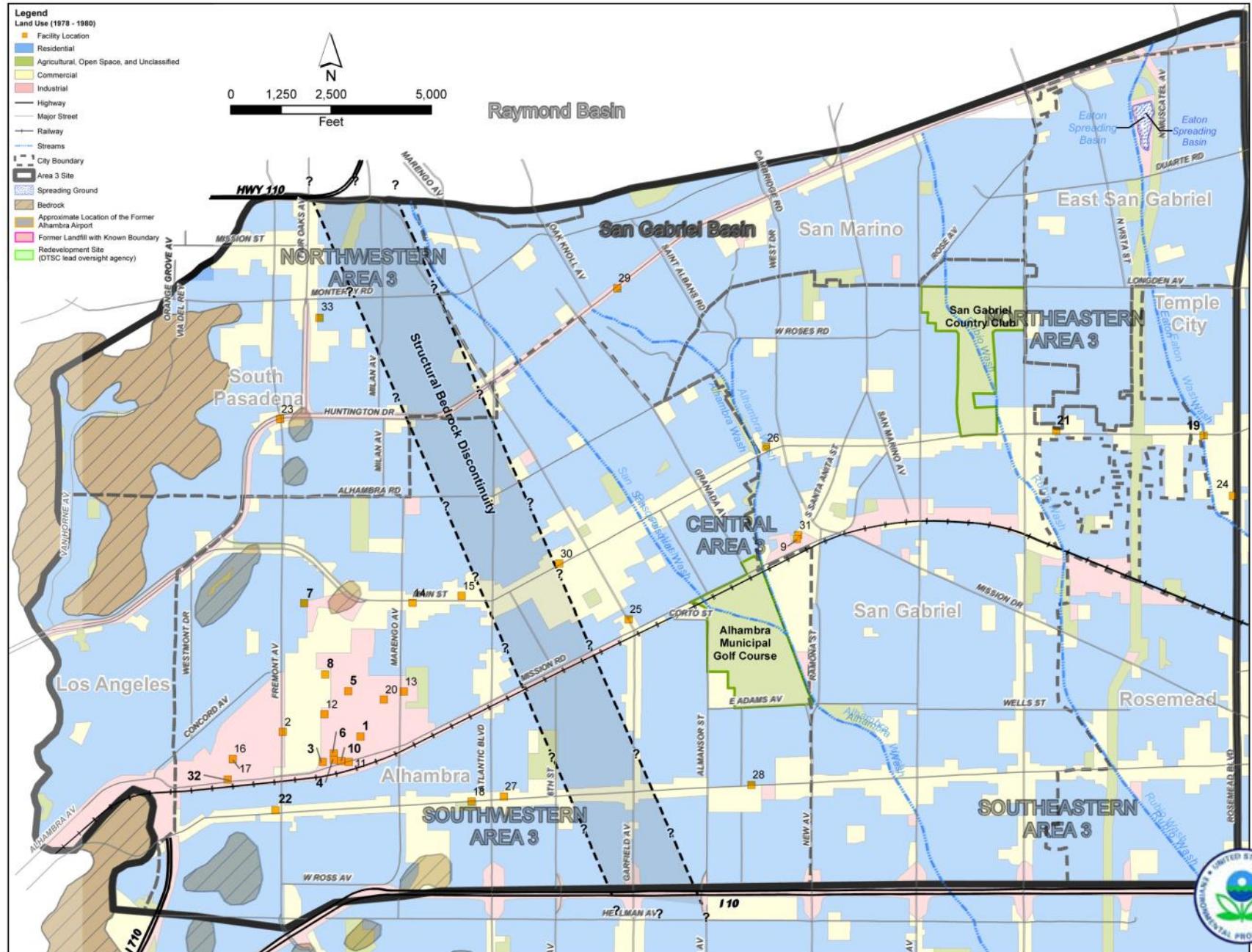


# Potential Source Facilities Initially Screened in Area 3

## - Over 500



# Facilities with Soil, Soil Vapor, or Ground Water Data



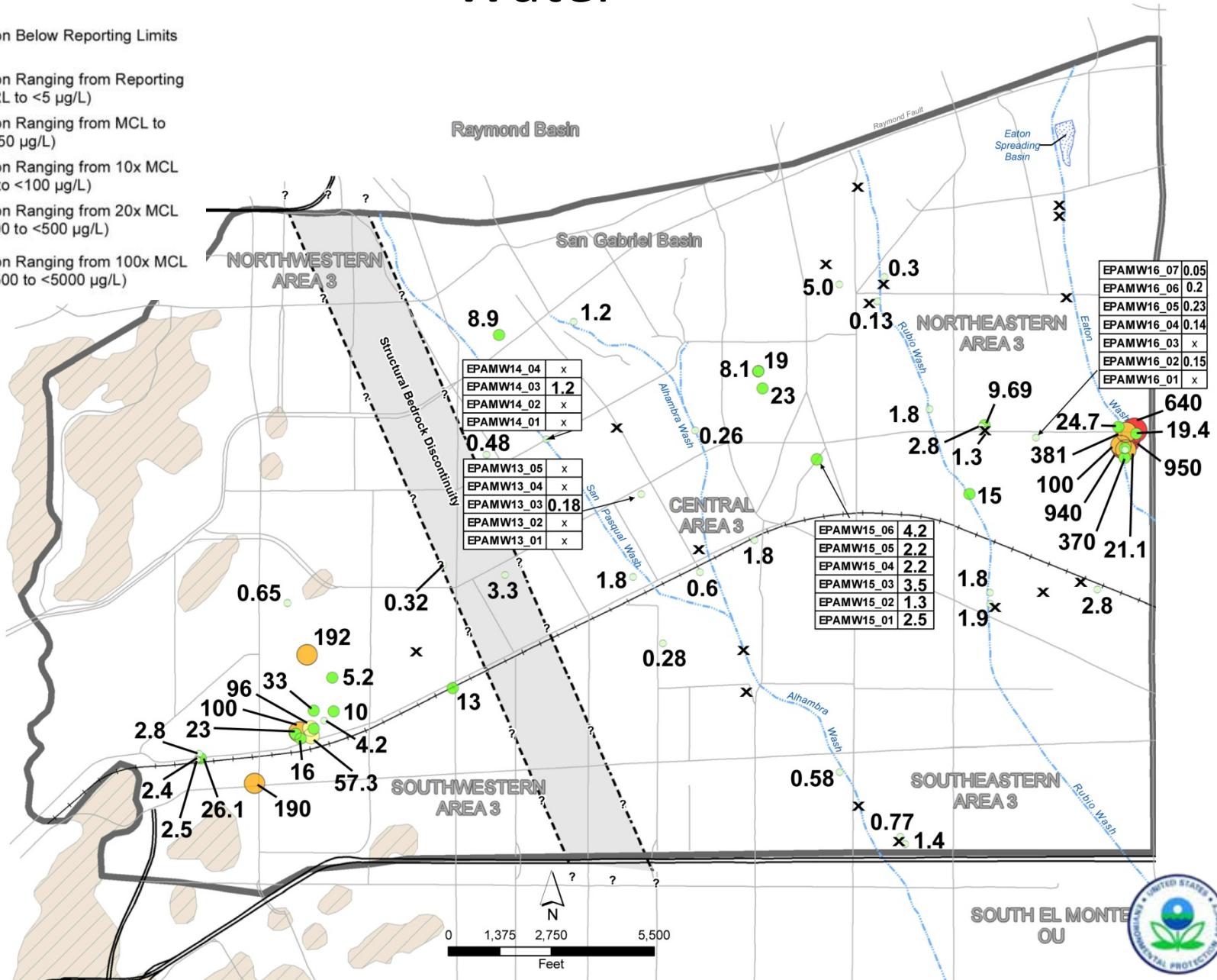
# Outcome of Contaminant Source Investigations

- Specific locations of sources remain unknown
- Extensive source investigation has reduced uncertainty to acceptable level
  - Unlikely that any major unidentified sources exist

# Maximum PCE Concentrations ( $\mu\text{g/L}$ ) in Ground Water

## Legend

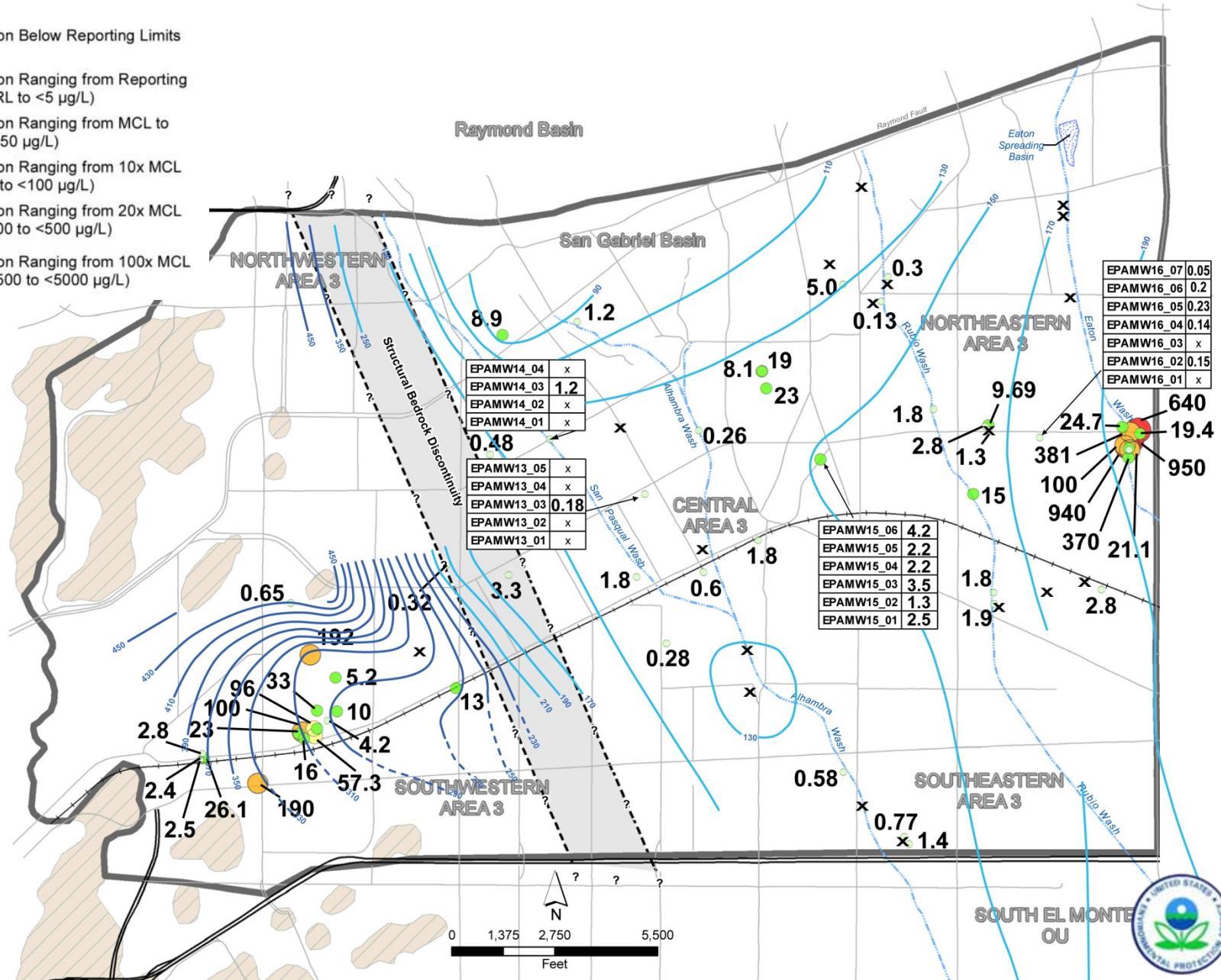
- X PCE Concentration Below Reporting Limits (RL) or ND
- PCE Concentration Ranging from Reporting Limits to <MCL (RL to <5  $\mu\text{g/L}$ )
- PCE Concentration Ranging from MCL to <10x MCL (5 to <50  $\mu\text{g/L}$ )
- PCE Concentration Ranging from 10x MCL to <20x MCL (50 to <100  $\mu\text{g/L}$ )
- PCE Concentration Ranging from 20x MCL to <100x MCL (100 to <500  $\mu\text{g/L}$ )
- PCE Concentration Ranging from 100x MCL to <1000x MCL (500 to <5000  $\mu\text{g/L}$ )



# Potential Migration Pathways of PCE in Ground Water

## Legend

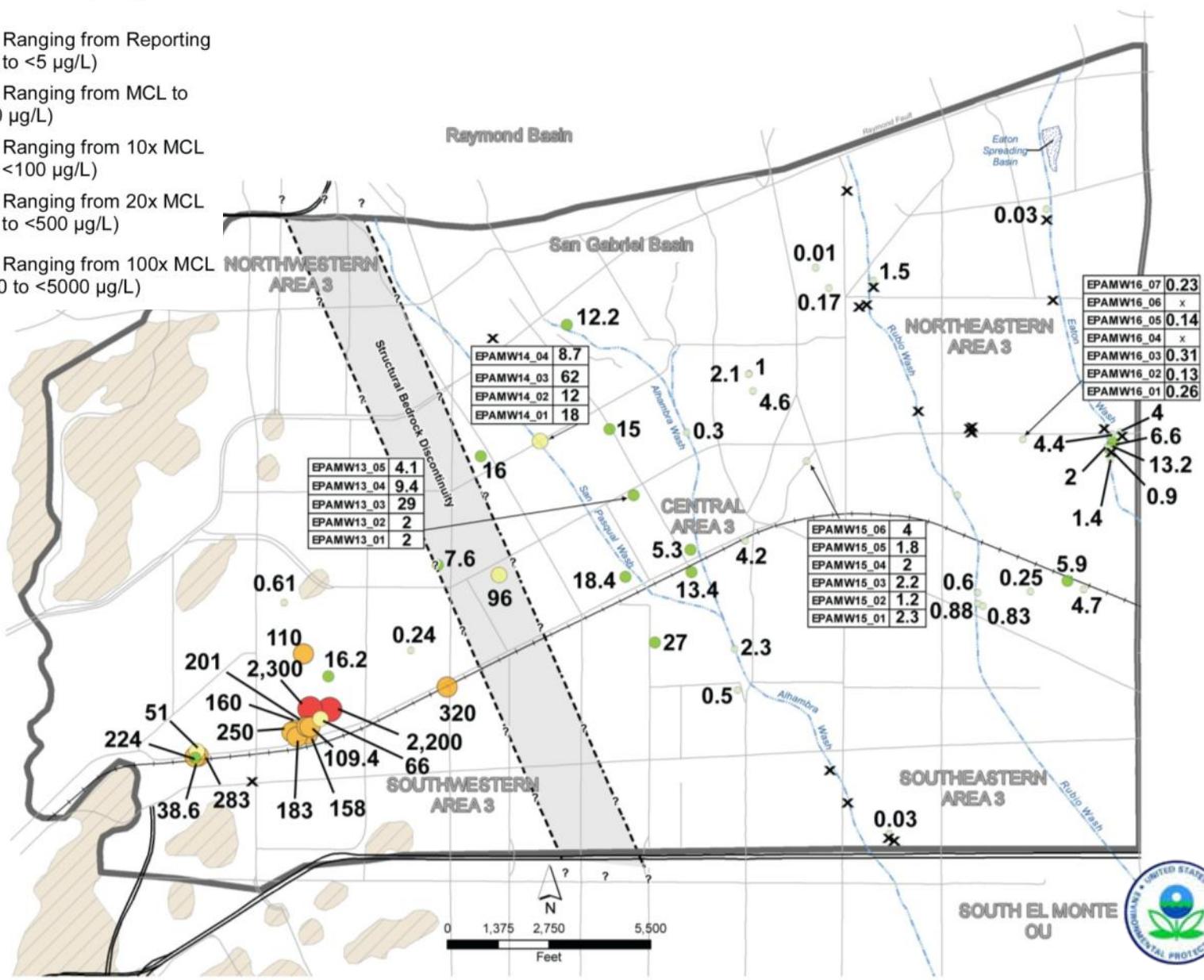
- ✗ PCE Concentration Below Reporting Limits (RL) or ND
- PCE Concentration Ranging from Reporting Limits to <MCL (RL to <5 µg/L)
- PCE Concentration Ranging from MCL to <10x MCL (5 to <50 µg/L)
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- PCE Concentration Ranging from 20x MCL to <100x MCL (100 to <500 µg/L)
- PCE Concentration Ranging from 100x MCL to <1000x MCL (500 to <5000 µg/L)



# Maximum TCE Concentrations ( $\mu\text{g}/\text{L}$ ) in Ground Water

## Legend

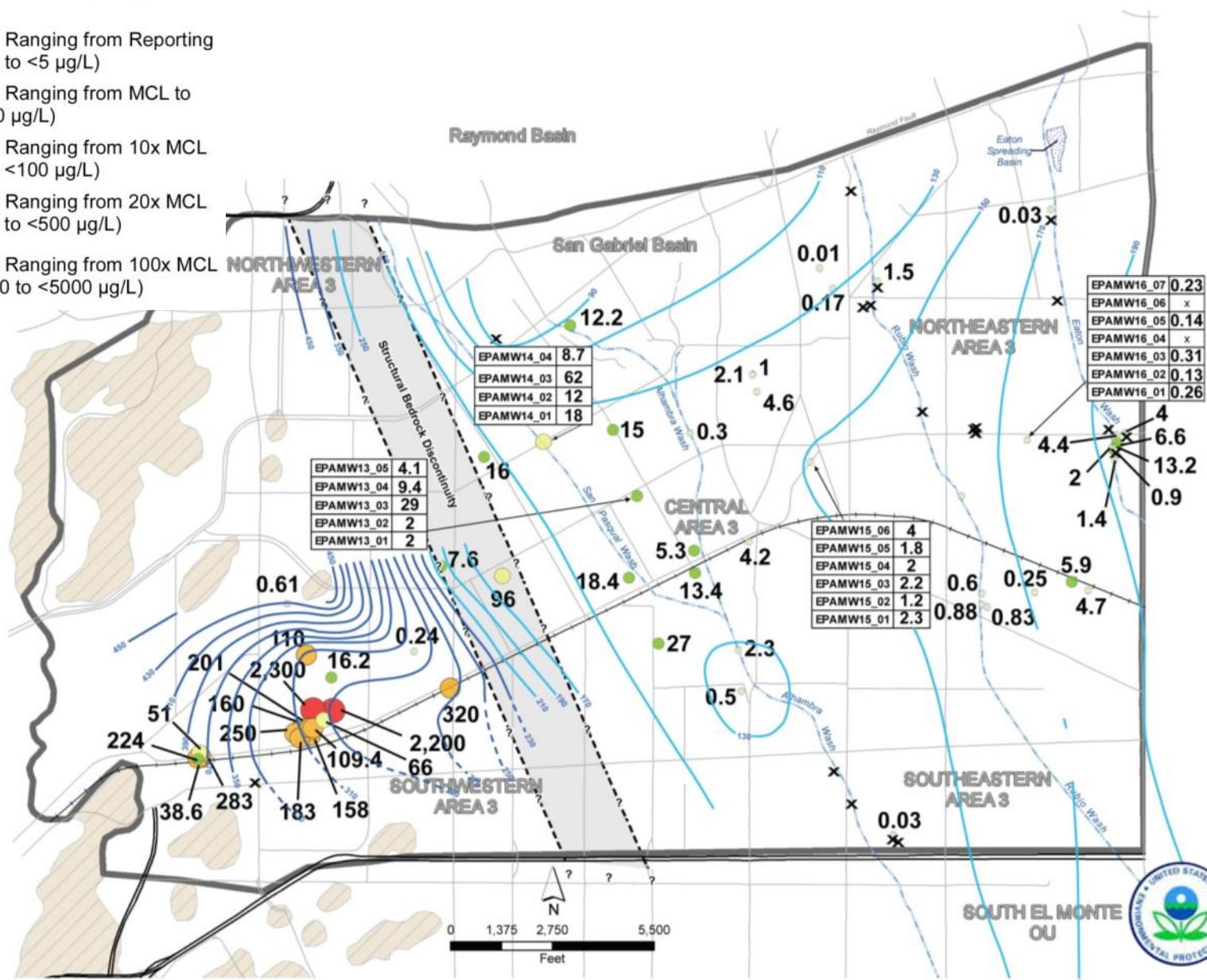
- × TCE Concentration Below Reporting Limits (RL) or ND
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# Potential Migration Pathways of TCE in Ground Water

## Legend

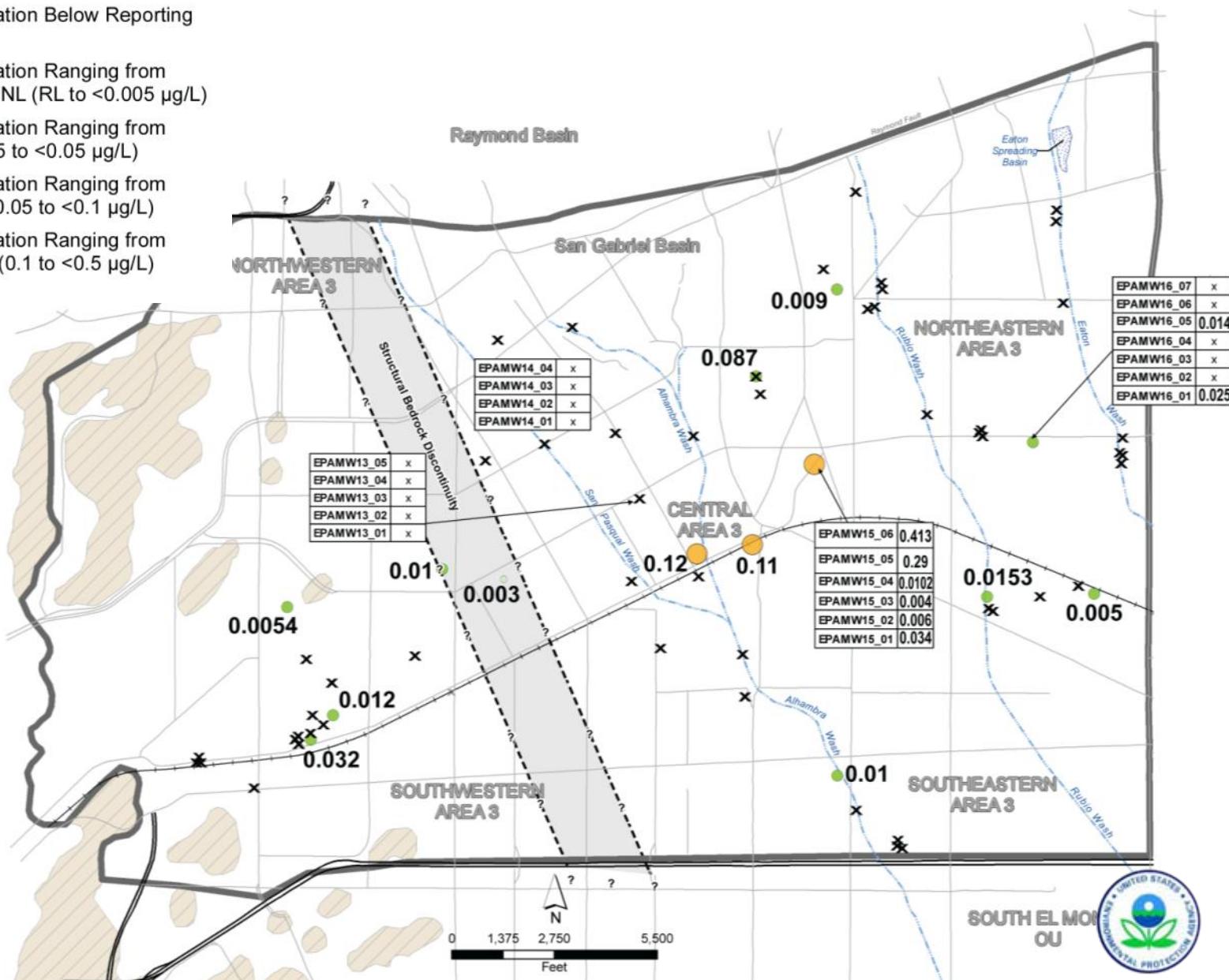
- ✗ TCE Concentration Below Reporting Limits (RL) or ND
- TCE Concentration Ranging from Reporting Limits to <MCL (RL to <5 µg/L)
- TCE Concentration Ranging from MCL to <10x MCL (5 to <50 µg/L)
- TCE Concentration Ranging from 10x MCL to <20x MCL (50 to <100 µg/L)
- TCE Concentration Ranging from 20x MCL to <100x MCL (100 to <500 µg/L)
- TCE Concentration Ranging from 100x MCL to <1000x MCL (500 to <5000 µg/L)



# Maximum 1,2,3-TCP Concentrations ( $\mu\text{g/L}$ ) in Ground Water

## Legend

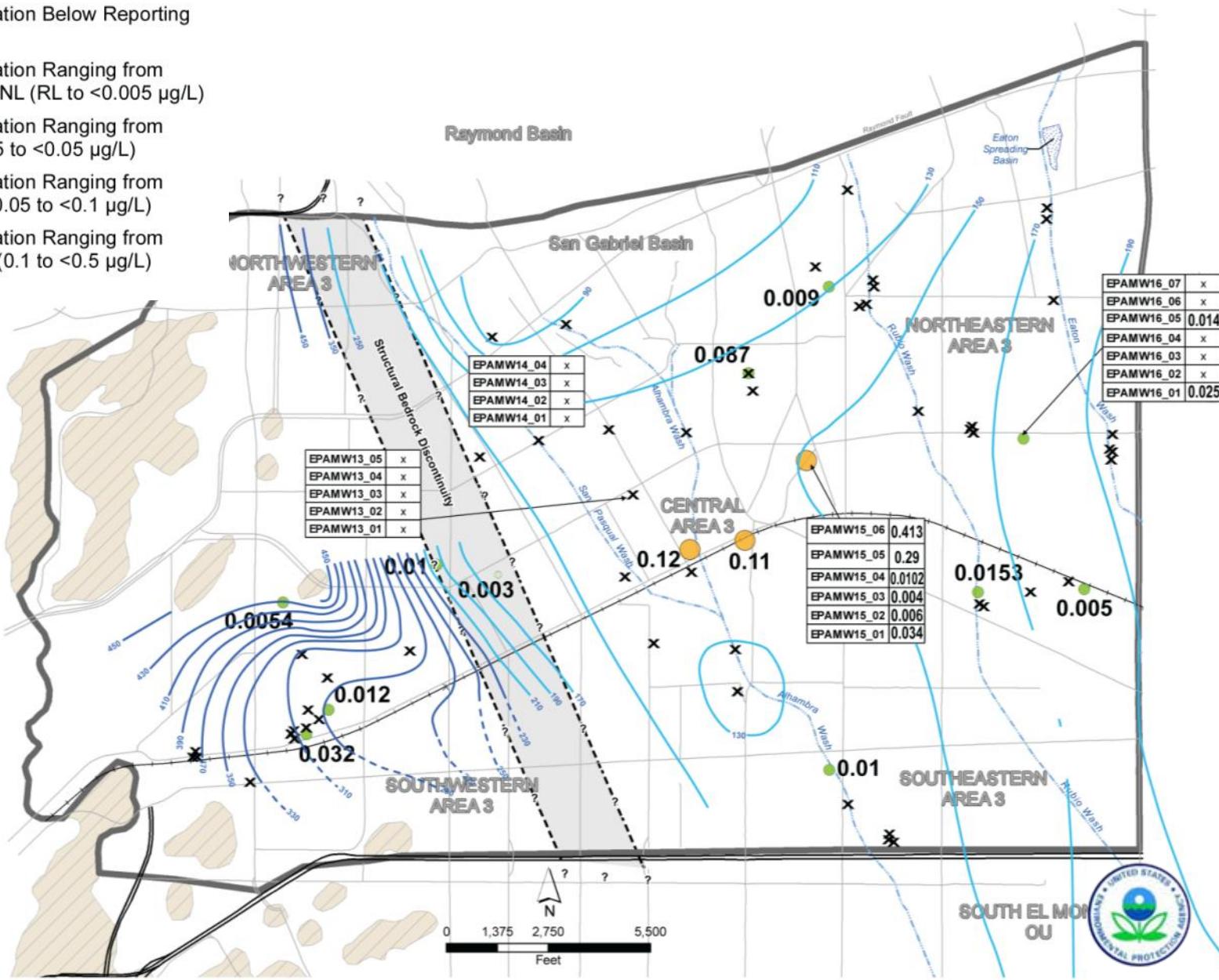
- × 1,2,3-TCP Concentration Below Reporting Limits (RL)
- 1,2,3-TCP Concentration Ranging from Reporting Limits to <NL (RL to <0.005  $\mu\text{g/L}$ )
- 1,2,3-TCP Concentration Ranging from NL to <10x NL (0.005 to <0.05  $\mu\text{g/L}$ )
- 1,2,3-TCP Concentration Ranging from 10x NL to <20x NL (0.05 to <0.1  $\mu\text{g/L}$ )
- 1,2,3-TCP Concentration Ranging from 20x NL to <100x NL (0.1 to <0.5  $\mu\text{g/L}$ )



# Maximum 1,2,3-TCP Concentrations and Distribution

## Legend

- × 1,2,3-TCP Concentration Below Reporting Limits (RL)
- 1,2,3-TCP Concentration Ranging from Reporting Limits to <NL (RL to <0.005 µg/L)
- 1,2,3-TCP Concentration Ranging from NL to <10x NL (0.005 to <0.05 µg/L)
- 1,2,3-TCP Concentration Ranging from 10x NL to <20x NL (0.05 to <0.1 µg/L)
- 1,2,3-TCP Concentration Ranging from 20x NL to <100x NL (0.1 to <0.5 µg/L)



# Proposed Future of Source Investigation Efforts in Ground Water Production Zone

- Focus on investigating PCE releases likely linked to five dry cleaners
- Forego extensive further investigation
- Estimate of investigation costs:
  - Focused efforts: \$705K for six potential source facilities (one outside of production zone)
  - Extensive efforts: \$12 M for 100 potential source facilities



# Potential Remedial Action Objectives

- If ground water restoration is the goal, then complicating factors include:
  - Unknown sources – high cost to investigate large area and many potential sources
  - Extensive time period to achieve restoration
  - Implementability of remedy
- If well head treatment/containment is the goal, then complicating factors include:
  - Support for desired final ROD questionable
  - Need for coordinated pumping among purveyors



# Potential Elements of Restoration Remedy

- Production zone (east of bedrock discontinuity) - extensive pump and treat system in addition to well head treatment; in situ methods impracticable
- Outside of production zone (west of bedrock discontinuity) – FS will evaluate remedial alternatives

# Potential Elements of Containment Remedy

- Focus on ground water production zone
- Ground water pumping with treatment at well head
- Involvement of water purveyors in operation of remedy, will require groundwater management plan
- Focused source investigation and remediation as feasible



# Ground Water Restoration Challenges

- Impracticable to identify all sources of contamination
- Exhaustive pumping throughout site needed
- Expense
- Water rights might complicate implementation



# Summary

- Potential RAOs for Area 3:
  - Recommend ground water containment
- Ground water restoration likely impracticable due to:
  - Large scale of contamination and large volume to treat
  - Implementability of full scale pump and treat
- Recommend develop a Final ROD



# Questions

- Is a TI waiver for ground water production zone based on impracticability of restoration needed?
- Others?

# Contact Information

- If you have questions or input, please contact:
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